

In this study we examine the predictability of seasonal mean Great Plains precipitation using an ensemble of century-long atmospheric general circulation model (AGCM) simulations forced with observed sea surface temperatures (SSTs). The results show that the predictability (intra-ensemble spread) of the precipitation response to SST forcing varies on interannual and longer time scales. In particular, we find that pluvial conditions are more predictable (have less intra-ensemble spread) than drought conditions. This rather unexpected result is examined in the context of the physical mechanisms that impact precipitation in the Great Plains. These mechanisms include El Nino/Southern Oscillation's impact on the planetary waves and hence the Pacific storm track (primarily during the cold season), the role of Atlantic SST's in forcing changes in the Bermuda high and low level moisture flux into the continent (primarily during the warm season), and soil moisture feedbacks (primarily during the warm season). We find that the changes in predictability are primarily driven by changes in the strength of the land-atmosphere coupling, such that under dry conditions a given change in soil moisture produces a larger change in evaporation and hence precipitation than the same change in soil moisture would produce under wet soil conditions. The above changes in predictability are associated with a negatively skewed distribution in the seasonal mean precipitation during the warm season – a result that is not inconsistent with the observations.